

October 21, 2012

Mr. Jose Torres  
EPA Region VI  
Dallas, Texas

Evidence for Groundwater Contamination at the Kingsville Dome Uranium In Situ Leach Mining Operations, Kingsville, Texas

Dear Mr. Torres:

Exploration records, mining permits and monitoring reports from the URI KVD ISL uranium mine indicate that groundwater in the Goliad sands was contaminated by the drilling of exploration boreholes and the operation of injection and extraction wells during ISL mining in PAA1, PAA2 and PAA3. As demonstrated in the ISL presentation given by STOP to Region VI EPA in Victoria, TX on August 5, 2011 (attached), present ISL mining regulations allow for the legal pollution of groundwater via improper drilling and borehole abandonment practices and the use of invalid scientific and statistical principles to establish baseline water quality in the mining zone and excursion values at the monitor well ring. The most egregious outcome from the poor regulations is a favorable decision to grant an aquifer exemption when baseline values have been intentionally elevated by the collection of biased samples from a narrow screen interval (10 to 15 ft) in the ore zone after oxidation of the deposit by air jetting during well development. Equally as outrageous is the invalid statistical bias used to set very high uranium values as an excursion limit at the monitor well and the installation of a long screen interval (50 to 80 ft) to dilute a sample of the groundwater plume that may pass through the well screen. These legal but unethical and immoral practices have resulted in contaminated groundwater migration beyond the KVD monitor well ring and into the private well at Garcia Hill.

Water quality records are not well maintained and organized at TCEQ and the Texas Railroad Commission. STOP has used the freedom of information act and other means to collect a partial record over the past 30 years. It is disturbing that such records are so difficult to obtain from agencies that are chartered with protecting human health and the environment. We can clearly see that the URI operations are documented with a fragmentary public record that is anything but transparent to an independent assessment of their mining operations.

Despite the abysmal condition of the official URI records kept at public oversight agencies, the limited data that are available for boring logs and monitoring wells illustrates a clear impact on groundwater resources around the KVD ISL operations. Figure 1 is a summary of uranium values for production area wells, monitoring wells within and above the ore zone, the monitoring well ring, and the Garcia wells. An Excel spreadsheet is attached that contains the data used for Figure 1.

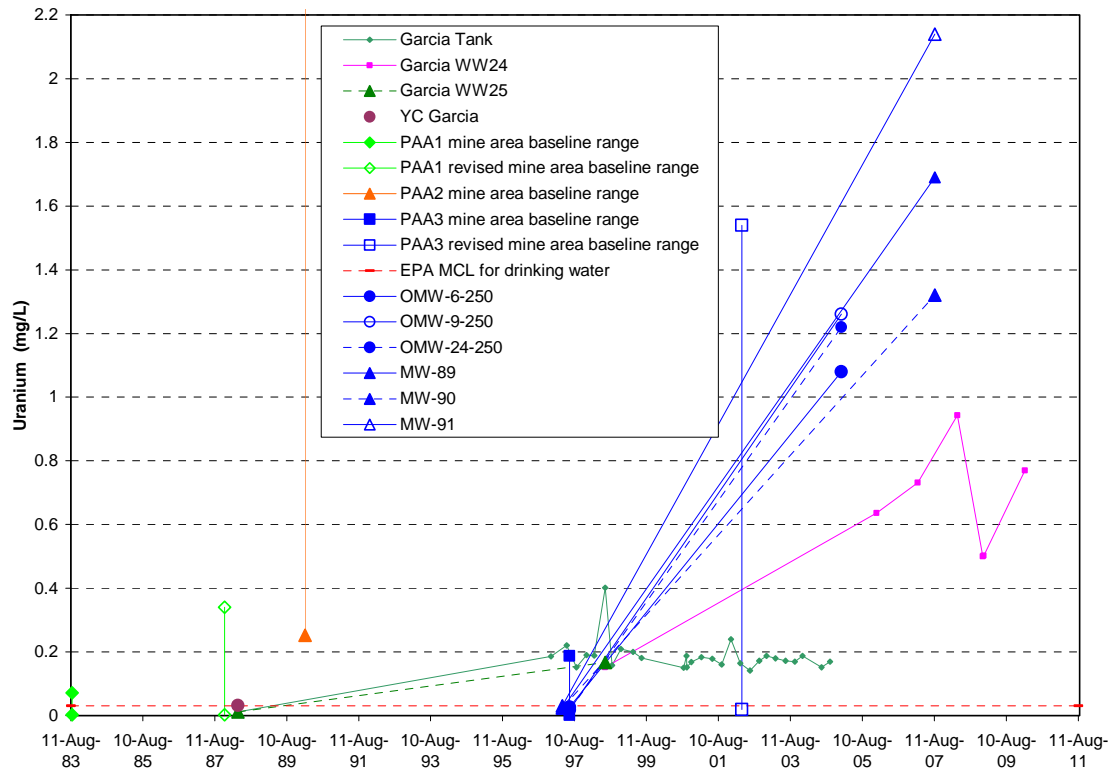


FIGURE 1. Timeline for uranium concentrations at URI KVD wells and Garcia wells.

The initial permit to request ISL mining in PAA1 contains 1983 water quality data from wells placed in the production zone of PAA1, and uranium values in these wells ranged from 0.002 to 0.071 mg/L (light green solid diamonds; Fig 1). Four years later, after hundreds of additional exploration boreholes had been drilled, URI revises baseline for uranium from 0.002 to 0.34 mg/L (light green open diamonds; Fig 1). Extensive oxidation and disturbance of the ore during the drilling of hundreds of exploration boreholes results in high bias in the baseline water quality values for PAA1.

In 1988, prior to initiation of mining in PAA1, Garcia wells are sampled by URI and analyzed by Jordan Labs to establish uranium range of 0.011 to 0.031 mg/L (purple filled circle and solid dark green triangle; Fig 1). These wells fed the Garcia tank (small blue-green solid diamonds; Fig 1), which was commonly the sample point for subsequent analyses. Sample records between 1988 and 1997 were not found, and between this time interval the Garcia tank samples rose from below the EPA MCL for uranium (<0.03 mg/L) to nearly 0.2 mg/L. Also, one of the Garcia wells (W25) sampled 10 years later and analyzed by Jordan Labs, showed that the uranium concentration has risen to 0.167 mg/L (1998, solid dark green triangle). As mining had commenced in PAA3 at the same time as the 1998 sample revealed contaminated groundwater, the contamination is attributed to the hundreds of exploration boreholes placed upgradient from the Garcia property.

In 1989, URI established baseline conditions in PAA2 downgradient from active mining operations in PAA1. Solid orange triangles on Figure 1 show the range in uranium values (0.252 to 3.75 mg/L), which are biased high and invalid due to collection of samples after hundreds of exploration boreholes had been drilled and active ISL mining upgradient in PAA1.

In August 1989, URI established invalid uranium baseline values of 0.001 to 0.187 mg/L for PAA3 (filled blue squares; Fig 1) and reported baseline values for the overlying monitoring wells (OMW, blue filled and open circles) and production zone monitoring wells (MW, blue filled and open triangles) in the ring around the mining zone. All of the OMW and MW plotted on Figure 1 had initial uranium values at or below the EPA MCL of 0.03 mg/L.

Mining in PAA3 commenced in 1998 and, four years later, URI revised uranium baseline values for PAA3 to 0.019 to 1.54 mg/L (open blue squares, Fig 1). Therefore, the initial invalid uranium baseline values were biased high by an additional order of magnitude after active mining had taken place in PAA3. It is unconscionable how such unethical manipulation of baseline values could be approved by TCEQ.

In January 2005, three monitoring wells in the overlying sand (OMW, open and filled blue circles, Fig 1) record uranium levels that exceed 1 mg/L, approximately 100 times above the baseline values for the wells. This demonstrates the migration of uranium contamination from the mining zone to the overlying sand, which indicates the lack of a confining zone between the ore horizon sand and overlying sand and/or the communication between the sands by improperly abandoned exploration boreholes and/or improperly constructed wells in the ore zone.

In August of 2007, similar groundwater contamination is observed at three wells along the monitoring well ring between PAA3 and the Garcia property (MW, open and filled blue triangles). This indicates groundwater has been contaminated outside of the aquifer exemption zone.

Although the baseline values for the OMW and MW on Figure 1 were established by Jordan Labs, the biweekly sampling and analysis of the monitoring wells was done by the URI lab, which reports detected results only if they exceed 1 mg/L. Clearly, the URI detection limit for uranium of 1 mg/L does not provide adequate monitoring of the uranium plumes moving away from the mining zone. Hundreds of additional results for the monitoring wells are reported as < 1 mg/L, which allows uranium contamination up to 1 mg/L to move beyond the mining zone. It is highly probable that contamination would be found along the entire downgradient trace of the MW ring if detection levels of 0.01 mg/L were used for uranium.

Returning to the Garcia wells, URI drilled a replacement well (W24, pink squares on Fig 1) for the Garcia family in 1989, during a period of extensive exploration drilling around the Garcia property. Gamma and neutron logs of the nearest exploration boreholes upgradient from the Garcia property show uranium ore in Garcia 10 at 550 to 590 feet

below ground surface (fbgs) and in Garcia 9 ore is present at 740 to 760 fbgs. An exploration well downgradient from the Garcia property (Garcia 5) shows no indication of uranium ore. Drilling records indicate the replacement water well drilled by URI for Garcia went to a depth of 770 fbgs, and it was screened somewhere between 700 and 870 fbgs. We have not seen a gamma log from the W24 well, but uranium and radium-226 results discussed below indicate an ore horizon was not intersected by well W24. However, given that URI had gamma and neutron logs that showed ore was present around the 750 fbgs horizon upgradient of the Garcia property, it is puzzling as to why they would complete a family water well in the 750 fbgs horizon downgradient from extensive exploration activities that showed ore at this horizon.

An initial sampling and analysis record for W24 has not been located for 1997, but a 1998 result from Jordan Labs shows uranium at 0.152 mg/L. Because W25 and W24 feed the Garcia tank (small blue-green solid diamonds, Fig 1), the Garcia tank results are similar to W24 and W25 results in 1998. In 2004, W25 was abandoned due to sanding in of the screen zone and W24 became the only well supplying water to the Garcia family. Coincident with rising uranium levels in the OMW and MW between 2005 and 2008, uranium levels in W24 increased to nearly 1 mg/L (pink squares, Fig 1). This is clear evidence that mining solutions migrated from PAA3 to Garcia well W24.

Further evidence that the uranium at Garcia well W24 is from migration of contaminated groundwater and not from an ore deposit in the W24 well can be seen by a plot of uranium levels against radium-226 activity (Figure 2).

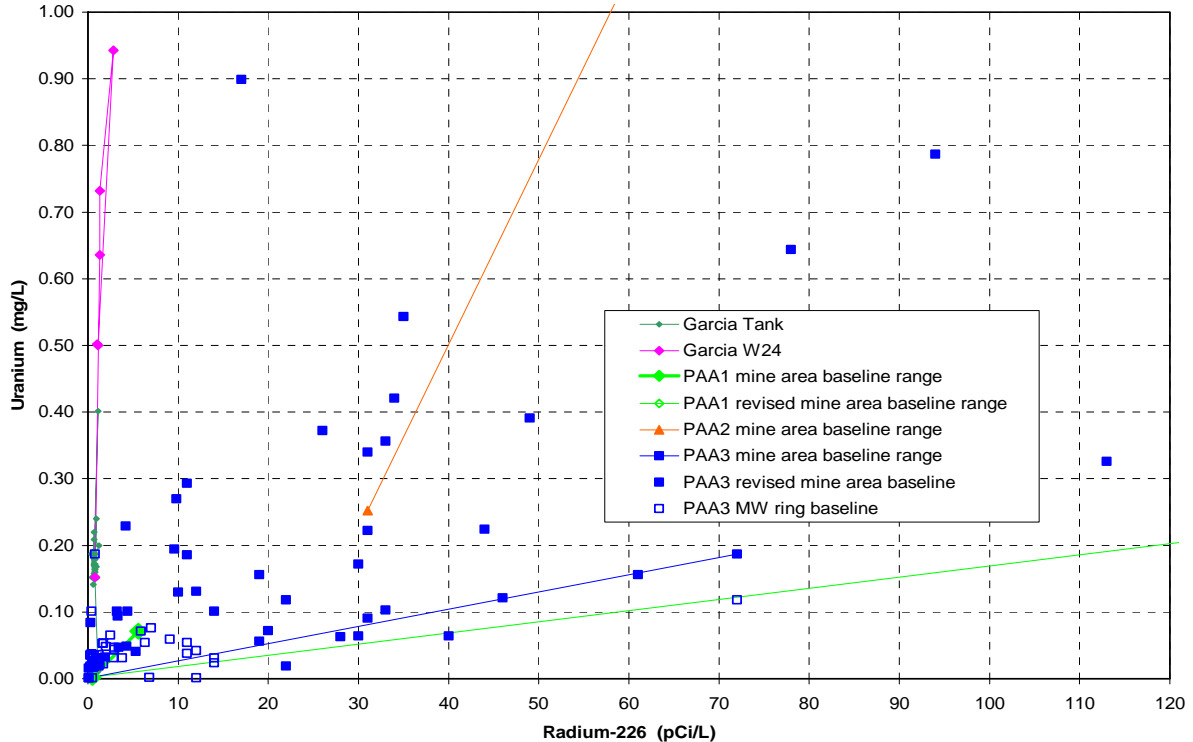


FIGURE 2. Ranges for uranium and radium-226 in ore zones and non-ore zones contaminated by uranium plumes from the mining zone.

When an ore zone is intersected by a boring and developed improperly with air jetting, the uranium ore is oxidized and dissolved, releasing both uranium and radium-226. This results in an increase in radium-226 as uranium levels go up, and this is seen for all the invalid baseline ranges reported for PAA1, PAA2, and PAA3. Additionally, once mining has disturbed the ore zone, uranium and radium-226 values increase to higher values in the ore zone, but as only uranium is mobile as the uranyl carbonate aqueous species, **it migrates away from the ore zone while radium-226 remains in the disturbed ore zone.**

**When there is no uranium ore zone present, such as at Garcia W24, an increase in uranium without an increase of radium-226 can only indicate that contaminated groundwater from the ore zone has migrated into the well.** If radium-226 results were available for the MW locations between the PAA3 and the Garcia property, a similar trend of increasing uranium with no increase in radium-226 would be seen for those MW locations where ore is absent. This is very strong evidence for the migration of contaminated groundwater outside the permitted exemption zone.

**In conclusion, the available data indicate that URI has not contained mining solutions vertically or horizontally within the permitted exemption boundary.** Contamination is evident in the overlying sand and beyond the monitor well ring. **Furthermore, the Garcia well has been contaminated by uranium mining solution that escaped from PAA3.** The above conclusions are my personal statements and do not reflect the views of STOP or any other organization. This geochemical analysis is an independent assessment that was performed without monetary compensation from STOP or any other organization. Please contact me if you have questions or wish to discuss the results further.

Sincerely,

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